

Fig. 1

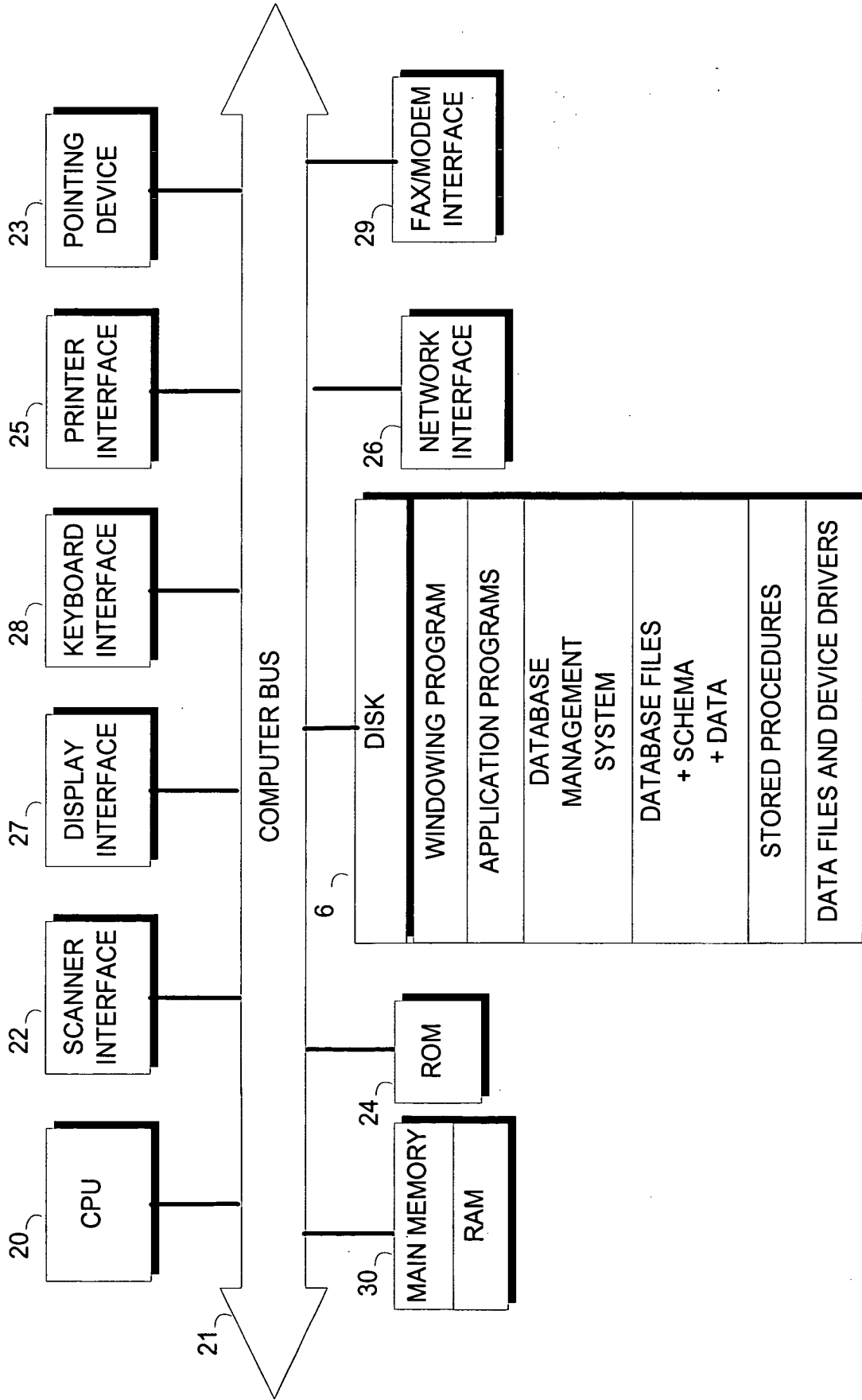


Fig. 2

| Products Table |               |              |          |
|----------------|---------------|--------------|----------|
| Product ID     | Description   | Manufacturer | Category |
| 1              | ACME Printer  | 1            | 1        |
| 2              | ACME Computer | 1            | 2        |
| 3              | Apex Computer | 2            | 2        |
| 4              | Best Printer  | 3            | 1        |
| 5              | Apex Monitor  | 2            | 3        |

| Manufacturers Bit Vector Index |            |
|--------------------------------|------------|
| Manufacturer ID                | Bit Vector |
| 1                              | 11000      |
| 2                              | 00101      |
| 3                              | 00010      |

| Categories Bit Vector Index |            |
|-----------------------------|------------|
| Category ID                 | Bit Vector |
| 1                           | 10010      |
| 2                           | 01100      |
| 3                           | 00001      |

| Manufacturers Table |              |
|---------------------|--------------|
| Manufacturer ID     | Manufacturer |
| 1                   | ACME         |
| 2                   | Apex         |
| 3                   | Best         |

| Categories Table |          |
|------------------|----------|
| Category ID      | Category |
| 1                | Printer  |
| 2                | Computer |
| 3                | Monitor  |

Fig. 3

300

| Products Table |               |              |          |
|----------------|---------------|--------------|----------|
| Product ID     | Description   | Manufacturer | Category |
| 1              | ACME Printer  | 1            | 1        |
| 2              | ACME Computer | 1            | 2        |
| 3              | Apex Computer | 2            | 2        |
| 4              | Best Printer  | 3            | 1        |
| 5              | Apex Monitor  | 2            | 3        |

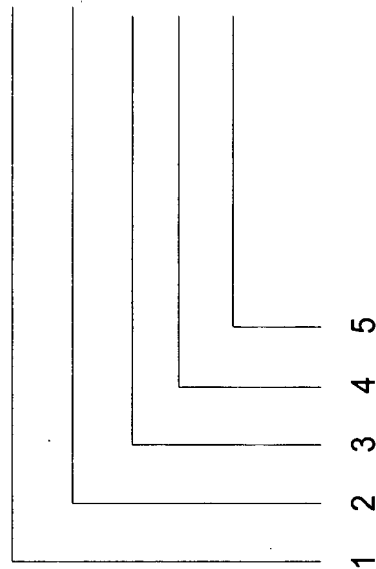
310

311

312

313

314



Product ID

Indexed Value

|              |   |   |   |   |   |     |
|--------------|---|---|---|---|---|-----|
| Manufacturer | 1 | 1 | 0 | 0 | 0 | 430 |
|              | 2 | 0 | 0 | 1 | 0 | 431 |
|              | 3 | 0 | 0 | 0 | 1 | 432 |
| Category     | 1 | 1 | 0 | 0 | 0 | 440 |
|              | 2 | 0 | 0 | 1 | 0 | 441 |
|              | 3 | 0 | 0 | 0 | 1 | 442 |

Fig. 4

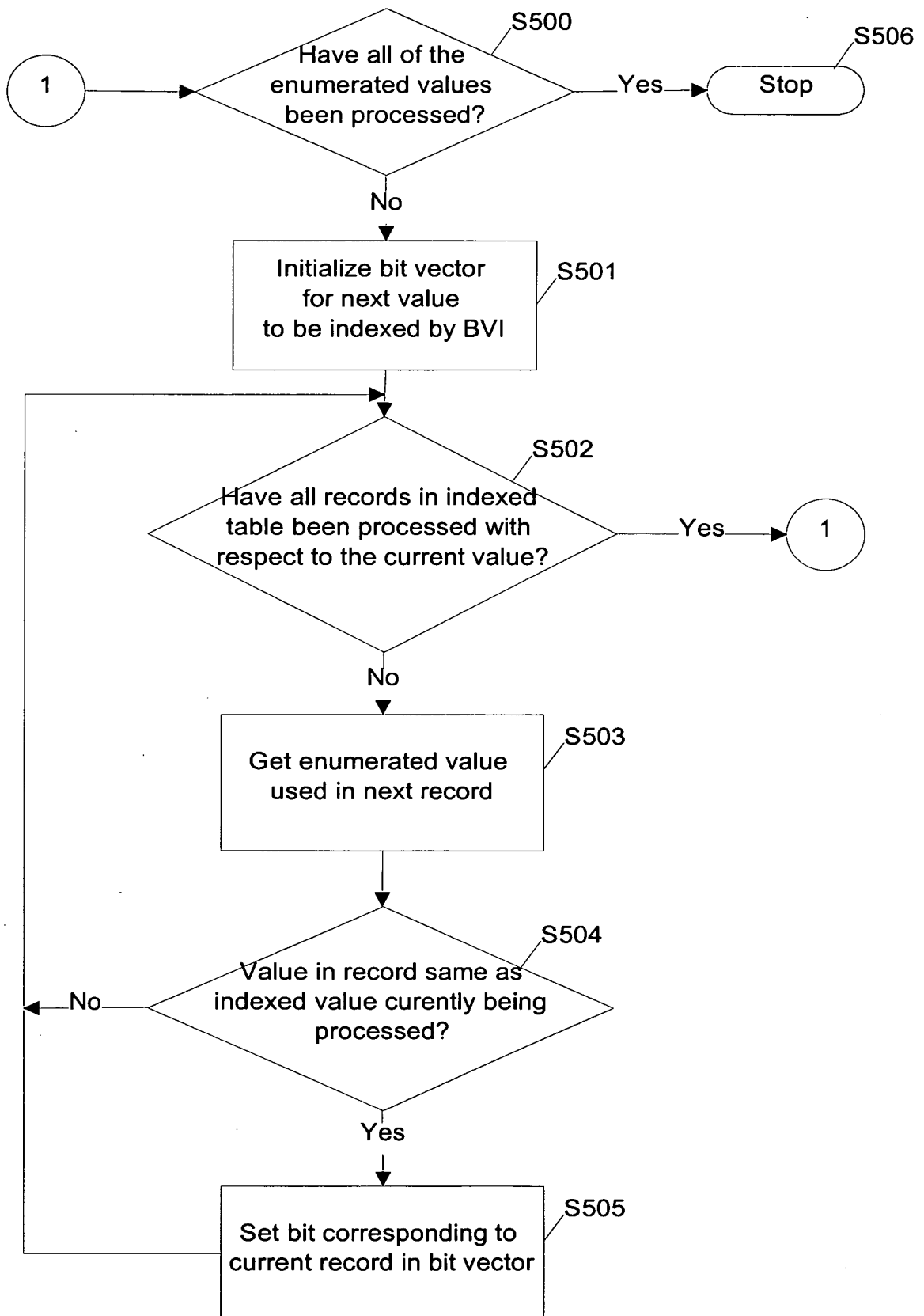


Fig. 5

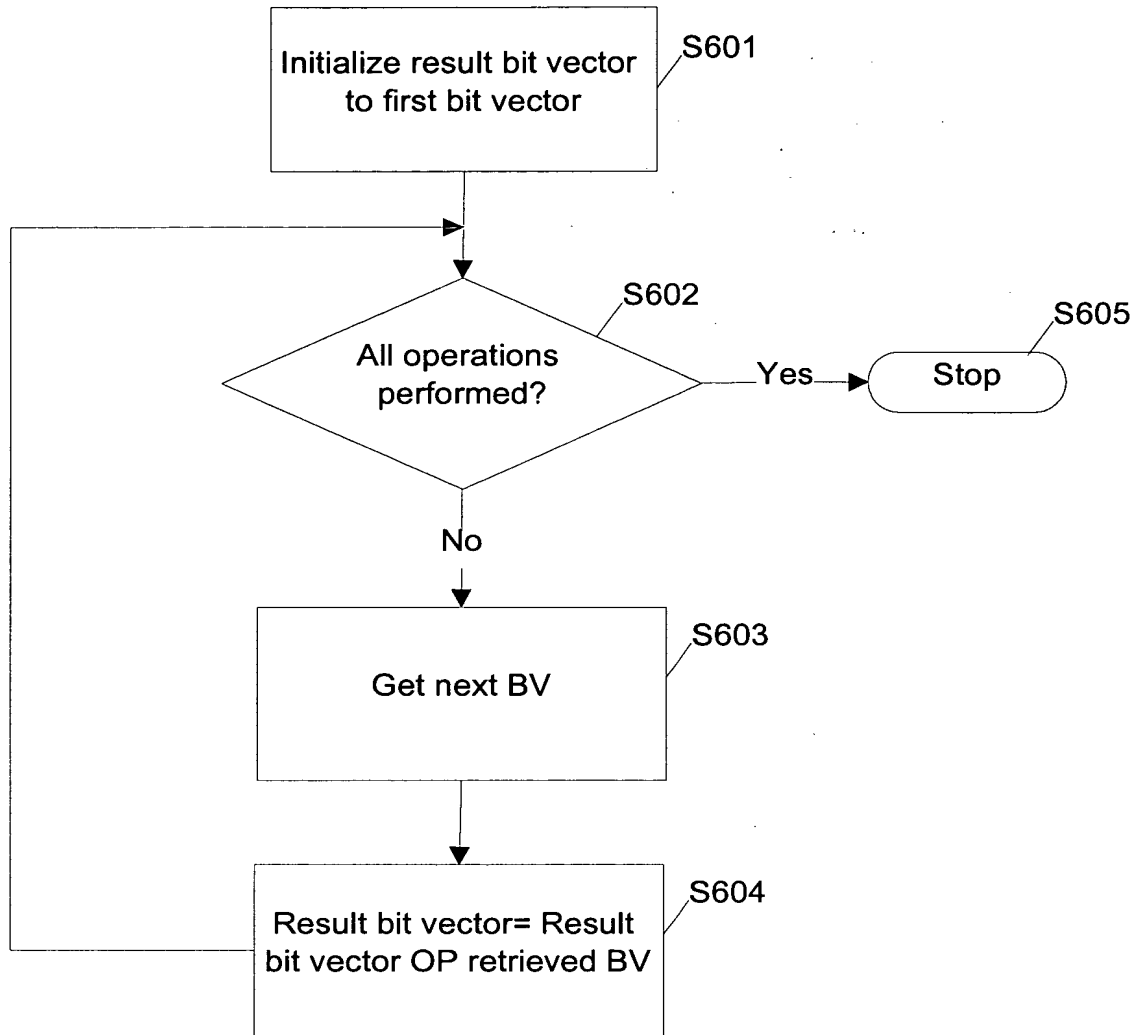
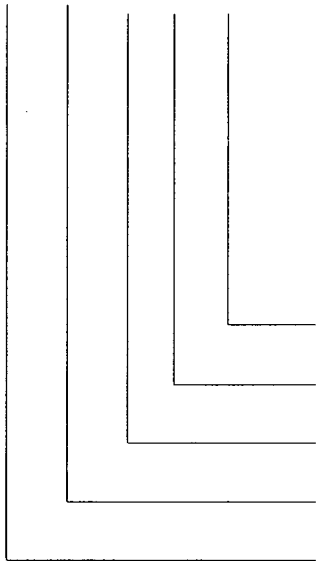


Fig. 6

300

| Products Table |               |              |          |
|----------------|---------------|--------------|----------|
| Product ID     | Description   | Manufacturer | Category |
| 1              | ACME Printer  | 1            | 1        |
| 2              | ACME Computer | 1            | 2        |
| 3              | Apex Computer | 2            | 2        |
| 4              | Best Printer  | 3            | 1        |
| 5              | Apex Monitor  | 2            | 3        |

310  
311  
312  
313  
314



Product ID 1 2 3 4 5

ACME 1 1 0 0 0 700

OR  
Apex 0 0 1 0 1 701

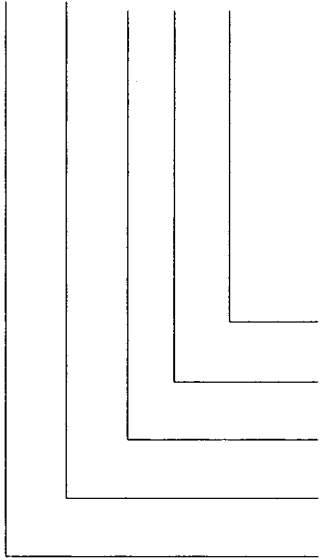
1 1 1 0 1 702

Fig. 7A

300

| Products Table |               |              |          |
|----------------|---------------|--------------|----------|
| Product ID     | Description   | Manufacturer | Category |
| 1              | ACME Printer  | 1            | 1        |
| 2              | ACME Computer | 1            | 2        |
| 3              | Apex Computer | 2            | 2        |
| 4              | Best Printer  | 3            | 1        |
| 5              | Apex Monitor  | 2            | 3        |

310  
311  
312  
313  
314



Product ID 1 2 3 4 5

ACME "OR" Apex 1 1 1 0 1 702

AND

Computer 0 1 1 0 0 711

0 1 1 0 0 712

Fig. 7B



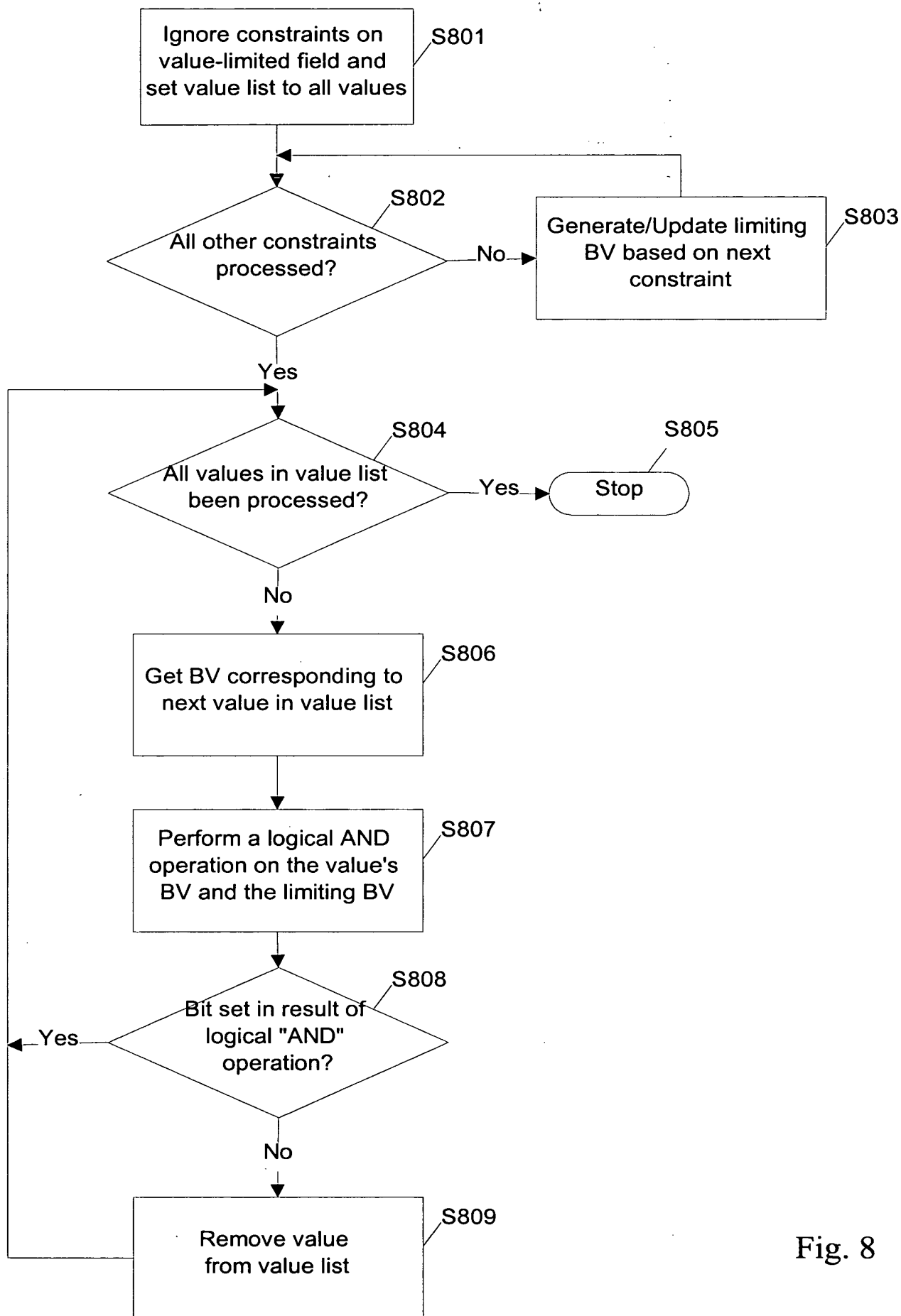


Fig. 8

| Initial<br>Value List | 900 | ACME      | Apex      | Best      | 901<br>Resulting<br>Value List |
|-----------------------|-----|-----------|-----------|-----------|--------------------------------|
| ACME                  |     |           |           |           |                                |
| Apex                  |     |           |           |           |                                |
| Best                  |     |           |           |           |                                |
|                       |     | 1 1 0 0 0 | 0 0 1 0 1 | 0 0 0 1 0 | 932 ACME<br>Apex               |
|                       |     | AND       | AND       | AND       |                                |
|                       |     | 941       | 941       | 941       | 941                            |
| Computer BV           |     | 0 1 1 0 0 | 0 1 1 0 0 | 0 1 1 0 0 |                                |
|                       |     | 951       | 952       | 953       |                                |
|                       |     | 0 1 0 0 0 | 0 0 1 0 0 | 0 0 0 0 0 |                                |

Fig. 9A

| Initial<br>Value List | 900 | Printer   | Computer  | Monitor   | 901<br>Resulting<br>Value List |
|-----------------------|-----|-----------|-----------|-----------|--------------------------------|
| Printers              |     |           |           |           |                                |
| Computers             |     |           |           |           |                                |
| Monitors              |     |           |           |           |                                |
|                       |     | 1 0 0 1 0 | 0 1 1 0 0 | 0 0 0 0 1 | 942 Printers<br>Computers      |
|                       |     | AND       | AND       | AND       |                                |
|                       |     | 930       | 930       | 930       | 930                            |
| ACME BV               |     | 1 1 0 0 0 | 1 1 0 0 0 | 1 1 0 0 0 |                                |
|                       |     | 954       | 955       | 956       |                                |
|                       |     | 1 0 0 0 0 | 0 1 0 0 0 | 0 0 0 0 0 |                                |

Fig. 9B

1000

| CategoryID-to-ManufacturerID Bit Vector Index |            |   |   |      |
|---|------------|---|---|------|
| Manufacturer ID                               | Bit Vector |   |   |      |
| 1   | 1          | 0 | 1 | 1014 |
| 2   | 1          | 1 | 0 | 1012 |
| 3   | 0          | 1 | 0 |      |

1001

| ManufacturerID-to-CategoryID Bit Vector Index |            |   |   |           |
|---|------------|---|---|-----------|
| Category ID                                   | Bit Vector |   |   |           |
| 1   | 1          | 1 | 0 |           |
| 2   | 0          | 1 | 1 | 1015 1013 |
| 3   | 1          | 0 | 0 |           |

Category ID = 1      1   0   1   1   0      1340

Cagegory ID = 2      0   1   0   0   0      1341

Fig. 10